45656

DRUM SEARCH

TORCH LAKE DRUM
HOUGHTON, MICHIGAN

September 1989

EPA Work Assignment No.: 1-295
Weston Work Order No.: 3347-11-01-2295
EPA Contract No.: 68-03-3482

FINAL DRAFT REPORT

Prepared by:

Roy F. Weston, Inc.

Sally Mayasich for S.M. 9/6/89
Sally Mayasich (Date)
Task Leader

W. Scott Butterfield 9/6/89
W. Scott Butterfield (Date)
Project Manager

Prepared for:

U.S. EPA/ERT

David W. Charters
Work Assignment Manager

rd:eh/MAYASICH/FR-2295

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rd:eh/MAYASICH/FR-2295

1.0 INTRODUCTION

1.1 Site Background

Torch Lake is a freshwater lake located approximately five miles north of Houghton, Michigan. Drums possibly containing wastes such as creosote from copper smelting operations have been reported to be in the lake. Creosote was used as a flotation medium to separate copper from the tailings because of its high specific gravity. As much as two million tons of copper ore tailings have been dumped into the lake.

The U.S. EPA Region V office contacted the U.S. EPA Environmental Response Team (ERT) to search for the drums and to determine whether any leakage of hazardous substances into the lake had occurred. The Response Engineering Analytical Contract (REAC) received a work assignment to assist EPA/ERT in this effort.

1.2 Site Description

The Torch Lake site location is shown in Figure 1. A staging area was established at the edge of the lake on the foundation of a demolished copper smelter just off Highway 26 between the towns of Hubbell and Lake Linden.

1.3 Objective

The objective of this investigation was to locate submerged drums in Torch Lake. Once these drums were located, a Remotely Operated Vehicle (ROV) with a video camera was used to enumerate and determine whether the drums were intact. Water samples were obtained to help determine whether any hazardous substances had entered the lake environment.

2.0 MATERIALS AND METHODS

2.1 Field Schedule and Personnel

Participating in the drum search August 3, 1989 were Walter Neid, EPA Region V On-Site Coordinator (OSC), David W. Charters, EPA/ERT Work Assignment Manager, Sally Mayasich, Richard Henry, and David Mickunas, Weston/REAC.

2.2 Drum Search

The OSC had information on the general location of the drums, and therefore no other locating systems were required. According to the OSC (Walter Neid, personal communication), previous proton magnetometer work detected approximately 100 metal items. Use of the ROV was necessary to distinguish between drums and other metal items. The ROV was deployed in the area designated by the OSC and thoroughly searched. Upon visual contact with a drum, the condition and contents of the

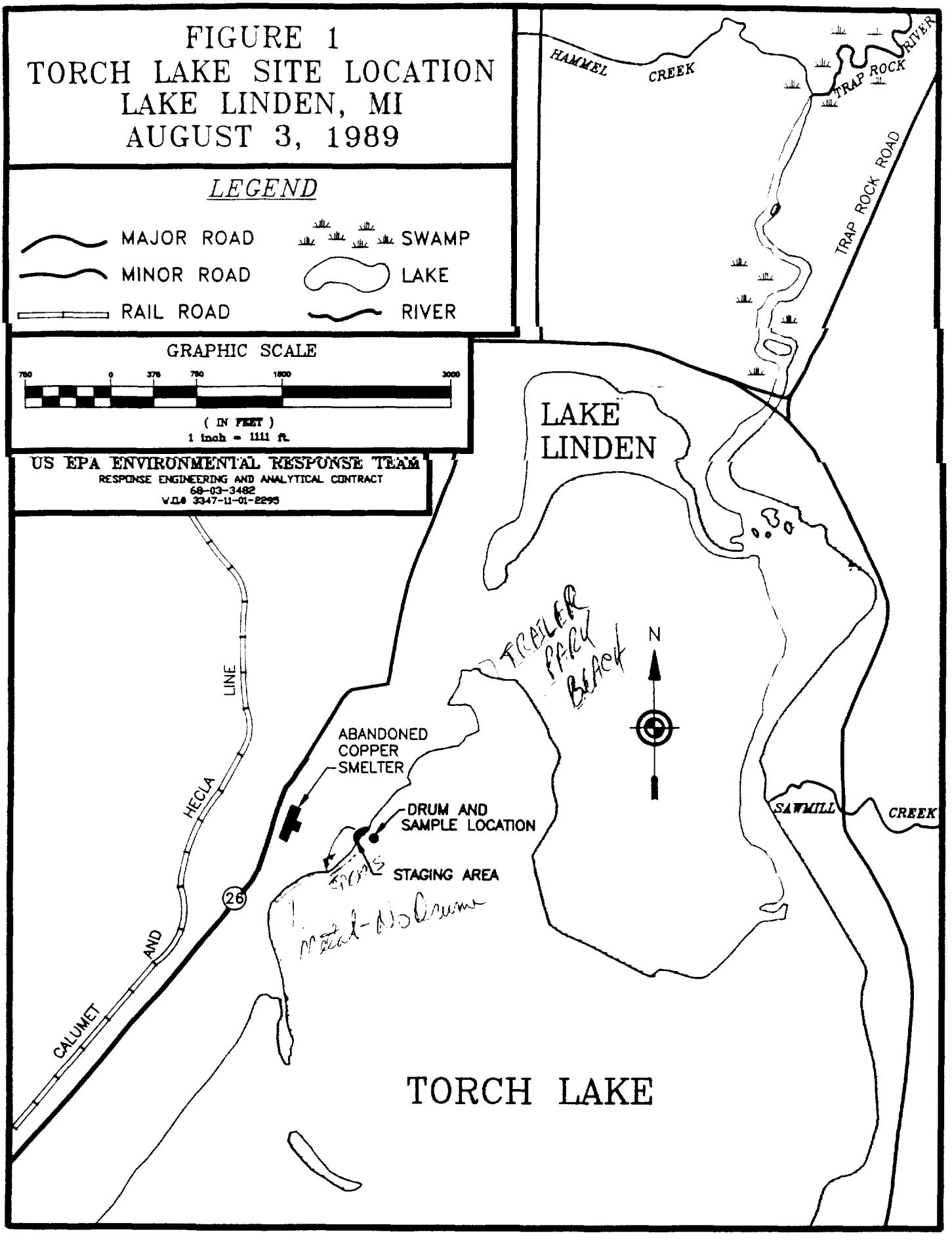
FIGURE 1
TORCH LAKE SITE LOCATION
LAKE LINDEN, MI
AUGUST 3, 1989
LEGEND
MAJOR ROAD
MINOR ROAD
RAIL ROAD
SWAMP
LAKE
RIVER
GRAPHIC SCALE
750 0 375 750 1500 3000
(IN FEET)
1 inch = 1111 ft.
US EPA ENVIRONMENTAL RESPONSE TEAM
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-03-3482
W.A. 3347-11-01-2295
HAMMEL CREEK
TRAP ROCK RIVER
TRAP ROCK ROAD
LAKE LINDEN
TRAILER PARK BEACH
N
ABANDONED COPPER SMELTER
DRUM AND SAMPLE LOCATION
STAGING AREA
SAWMILL CREEK
HECLA
AND
CALUMET
LINE
26
TORCH LAKE

drum were examined. The ROV cable was tended by one person from shore and another from the Zodiac inflatable boat. Floats had been placed on the ROV cable every 8 to 10 feet up to 50 feet from the ROV. The ROV, television monitor, video cassette recorder, and ROV control unit were powered by a gas generator.

2.3 Water Sampling and Water Quality Evaluation

Sampling, and in-situ water quality readings using the Hydrolab Surveyor II, were accomplished from the Zodiac boat at a site approximately 30 feet from shore over the drums. The total depth was 21.5 feet. One water sample was secured using a brass Kemmerer bottle which had been decontaminated using a soap water wash, deionized water rinse, nitric acid rinse, deionized water rinse, acetone rinse, and air dry. The sample was taken near the bottom and deposited in two 1 liter (l) amber glass bottles which were preserved for base/neutral/acid (BNA) extractable analysis at 4°C until receipt by the ERT/REAC-lab. The Hydrolab Surveyor II was calibrated and operated according to Hydrolab Corporation Surveyor II Operating Manual (Revision A, February, 1985). Parameters measured included temperature, dissolved oxygen, pH, conductivity, oxidation/reduction potential, and salinity. The site where the drums were located, collected samples and water quality readings taken, is shown in Figure 1.

3.0 RESULTS

3.1 General Observations

General biological and physical characteristics of Torch Lake were recorded. The plant community on the lakeshore included species typical of the regional vegetation, such as birch, aspen, alder, ash, and lichens. Opportunistic weed species were typical of a secondary successional plant community created by the demolition of the copper facility, and included ragweed, daisy, snapdragon, smartweed, flowering spurge, equisetum, common mullein, and common yarrow. Grasses were sparse. Soil composition consisted of coarse gravel and rock near the staging area. No aquatic plants were observed. The lake bottom was rocky near shore and appeared to be mucky further from shore, although no sediment samples were taken. Fish spotted by the ROV included a bass and a redhorse sucker. According to the OSC (Walter Neid, personal communication), sauger no longer reproduce in the lake.

3.2 Drum Search

All underwater search activities were observed on the video monitor and recorded on video cassette tapes. Ten drums were located and filmed near the staging area (see Figure 1); three were near shore in 6 to 8 feet of water and seven were approximately 50 to 75 feet up the shore to the north in 12 to 20 feet of water. Some of the drums were empty, others had solidified contents. All drums, including weathered drums found

at the water's edge appeared to have been on the site for a long period of time. Along the shore to the south, no drums were found, but other metal items such as rails and girders were observed.

3.3 Water Quality

The BNA analysis of the water sample from Torch Lake revealed that no compounds were detected at or above the method detection limit (MDL) of 10 ug/L (10 ppb) (see Appendix A). One compound, di-n-butylphthalate was detected below the MDL at 1 ppb in both the sample and blank.

In-situ water quality results are listed in Table 1. The readings were fairly uniform with respect to depth. Temperature, pH, and dissolved oxygen dropped only slightly with increasing depth while conductivity remained unchanged and oxidation-reduction potential (ORP) rose slightly. Salinity was zero at all depths.

4.0 DISCUSSION

The ROV was used successfully to locate drums at the bottom of Torch Lake. The water was relatively clear and the video camera was able to provide distinct pictures of the drums.

With regard to base/neutral/acid extractables, the water in Torch Lake was relatively free of those BNA compounds analyzed. The di-n-butylphthalate detected may have been due to contamination in the laboratory, possibly from rubber gloves worn by the analyst.

The water quality results reveal a relatively oligotrophic lake with a fairly low concentration of dissolved solids (low conductivity) and a high concentration of oxygen at all depths (Cole, 1975). This coincides with the observations of the rocky bottom near shore and the lack of aquatic plants, all pointing to low fertility. The high concentration of dissolved oxygen at all depths is typical of oligotrophic lakes with low amounts of organic matter in the sediments and low surface to volume ratio (Russell-Hunter, 1970), although the true characteristics of the lake have been changed by the deposition of copper tailings into the lake. In addition, the presence of copper tailings in the lake may indicate elevated copper concentrations in the water column. This may also be limiting productivity due to the toxic effects of copper on aquatic life.

5.0 CONCLUSIONS

The drums found both on shore and in the lake were either empty or contained solidified substances. Since the water analysis and water quality study did not indicate any disturbances, the contents of the drums were either diluted below the detection limits, were not soluble in water, or were contaminants that would not be detected by the analysis used.

rd:eh/MAYASICH/FR-2295

TABLE 1.

IN-SITU WATER QUALITY DATA
TORCH LAKE, LAKE LINDEN, MI
August 3, 1989

Depth (ft.)	Temp. (^{o}C)	Dissolved Oxygen (mg/L)	pH	Conductivity (mmhos/cm)	ORP (v)
1.0	23.71	10.26	7.49	0.254	0.152
2.0	23.71	10.23	7.57	0.253	0.152
3.0	23.71	10.17	7.57	0.254	0.152
4.0	23.67	10.16	7.60	0.254	0.153
5.0	23.66	10.17	7.60	0.254	0.154
6.0	23.64	10.10	7.61	0.254	0.154
7.0	23.64	10.14	7.62	0.254	0.155
8.0	23.62	10.06	7.60	0.254	0.156
9.0	23.53	9.95	7.59	0.254	0.157
10.0	23.50	10.00	7.57	0.255	0.158
11.0	23.45	9.98	7.57	0.254	0.159
12.0	23.40	9.86	7.55	0.253	0.160
13.0	23.20	9.85	7.53	0.254	0.161
14.0	22.85	9.86	7.49	0.253	0.163
15.0	22.60	9.69	7.45	0.254	0.165
16.0	22.36	9.66	7.37	0.254	0.167
17.0	22.29	9.59	7.36	0.254	0.168
18.0	22.13	9.43	7.33	0.254	0.169
19.0	21.68	9.22	7.28	0.255	0.171
20.0	21.49	9.22	7.25	0.254	0.172
21.0	21.28	9.21	7.20	0.254	0.173
21.5	21.26	9.21	7.19	0.254	0.173

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LITERATURE CITED

Cole, Gerald A. 1975. Textbook of Limnology. The C.V. Mosby Company, Saint Louis. 283 pp.

Russell-Hunter, W.D. 1970. Aquatic Productivity: An Introduction to Some Basic Aspects of Biological Oceanography and Limnology. Macmillan Publishing Company, Inc., New York. 306 pp.

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APPENDIX A

ANALYTICAL TESTING RESULTS

REAC SUPPORT ORGANIZATION
GSA RARITAN DEPOT
WOODBRIDGE AVENUE
BUILDING 209, BAY F
EDISON, NJ 08837
PHONE: 201-632-9200

DATE: Sept. 1, 1989

TO: R. Singhvi EPA ERT

FROM: A. Lo Surdo S&A Section Chief

SUBJECT: DOCUMENT TRANSMITTAL UNDER WORK ASSIGNMENT # 2-295

Attached please find the following document prepared under this work assignment:

Torch Lake

Central File WA# 2-295 (w/attachment)
W. Scott Butterfield
B. Cibulskis
D. Charters Work Assignment Manager

WESTON
MANAGERS DESIGNERS/CONSULTANTS
REAC SUPPORT ORGANIZATION
GSA RARITAN DEPOT
WOODBRIDGE AVENUE
BUILDING 209, BAY F
EDISON, NJ 08837
PHONE: 201-632-9200

DATE: Sept. 1, 1989

TO: R. Singhvi EPA ERT

FROM: A. Lo Surdo A. Lo Surdo S&A Section Chief

SUBJECT: TORCH LAKE RESULTS

Enclosed please find the results of the BNA analyses for the water sample from Torch Lake. The usual QC, surrogate spikes and matrix spike/matrix spike duplicates, was done. A complete analysis and data package are available upon request.

RESULTS OF BASE NEUTRAL/ACID EXTRACTABLES ANALYSIS

CLIENT ID :	BNA Blank	4338
FILE :	^LUN08	^LUN09
MATRIX :	WATER	WATER
DIL. FACT.:	1.0	1.0
UNITS :	ug/L	ug/L

COMPOUND	CONC.	MDL	CONC.	MDL	CONC.	MDL	CONC.	MDL	CONC.	MDL
Phenol	ND	10	ND	10						
bis(-2-Chloroethyl)Ether	ND	10	ND	10						
2-Chlorophenol	ND	10	ND	10						
1,3-Dichlorobenzene	ND	10	ND	10						
1,4-Dichlorobenzene	ND	10	ND	10						
Benzyl alcohol	ND	10	ND	10						
1,2-Dichlorobenzene	ND	10	ND	10						
2-Methylphenol	ND	10	ND	10						
bis(2-Chloroisopropyl)ether	ND	10	ND	10						
4-Methylphenol	ND	10	ND	10						
N-Nitroso-Di-n-propylamine	ND	10	ND	10						
Hexachloroethane	ND	10	ND	10						
Nitrobenzene	ND	10	ND	10						
Isophorone	ND	10	ND	10						
2-Nitrophenol	ND	10	ND	10						
2,4-Dimethylphenol	ND	10	ND	10						
Benzoic acid	ND	10	ND	10						
bis(2-Chloroethoxy)methane	ND	10	ND	10						
2,4-Dichlorophenol	ND	10	ND	10						
1,2,4-Trichlorobenzene	ND	10	ND	10						
Naphthalene	ND	10	ND	10						
4-Chloroaniline	ND	10	ND	10						
Hexachlorobutadiene	ND	10	ND	10						
4-Chloro-3-methylphenol	ND	10	ND	10						
2-Methylnaphthalene	ND	10	ND	10						
Hexachlorocyclopentadiene	ND	10	ND	10						
2,4,6-Trichlorophenol	ND	10	ND	10						
2,4,5-Trichlorophenol	ND	10	ND	10						
2-Chloronaphthalene	ND	10	ND	10						
2-Nitroaniline	ND	10	ND	10						
Dimethylphthalate	ND	10	ND	10						
Acenaphthylene	ND	10	ND	10						
3-Nitroaniline	ND	10	ND	10						
Acenaphthene	ND	10	ND	10						
2,4-Dinitrophenol	ND	10	ND	10						
4-Nitrophenol	ND	10	ND	10						
Dibenzofuran	ND	10	ND	10						
2,6-Dinitrotoluene	ND	10	ND	10						
2,4-Dinitrotoluene	ND	10	ND	10						
Diethylphthalate	ND	10	ND	10						
4-Chlorophenyl-phenylether	ND	10	ND	10						
Fluorene	ND	10	ND	10						

(J) Indicates compound concentration found below MDL.
ND Indicates compound Not Detected.

RESULTS OF BASE NEUTRAL/ACID EXTRACTABLES ANALYSIS

CLIENT ID :	BNA Blank	4338
FILE :	^LUN08	^LUN09
MATRIX :	WATER	WATER
DIL. FACT.:	1.0	1.0
UNITS :	ug/L	ug/L

COMPOUND	CONC.	MDL	CONC.	MDL	CONC.	MDL	CONC.	MDL	CONC.	MDL
4-Nitroaniline	ND	10	ND	10						
4,6-Dinitro-2-methylphenol	ND	10	ND	10						
N-Nitrosodiphenylamine	ND	10	ND	10						
4-Bromophenyl-phenylether	ND	10	ND	10						
Hexachlorobenzene	ND	10	ND	10						
Pentachlorophenol	ND	10	ND	10						
Phenanthrene	ND	10	ND	10						
Anthracene	ND	10	ND	10						
Di-n-butylphthalate	1(J)	10	1(J)	10						
Fluoranthene	ND	10	ND	10						
Pyrene	ND	10	ND	10						
Butylbenzylphthalate	ND	10	ND	10						
3,3'-Dichlorobenzidine	ND	10	ND	10						
Benzo(a)anthracene	ND	10	ND	10						
Bis(2-Ethylhexyl)phthalate	ND	10	ND	10						
Chrysene	ND	10	ND	10						
Di-n-octylphthalate	ND	10	ND	10						
Benzo(b)fluoranthene	ND	10	ND	10						
Benzo(k)fluoranthene	ND	10	ND	10						
Benzo(a)pyrene	ND	10	ND	10						
Indeno(1,2,3-cd)pyrene	ND	10	ND	10						
Dibenzo(a,h)anthracene	ND	10	ND	10						
Benzo(g,h,i)perylene	ND	10	ND	10						

(J) Indicates compound concentration found below MDL.
ND Indicates compound Not Detected

Roy F. Weston, Inc.
REAC, Edison, N.J.
EPA Contract 68-03-3482

CHAIN OF CUSTODY RECORD/LAB WORK REQUEST

No: 1072

SHEET NO. 1 OF 1

Project Name: TORCH LAKE
Project Number: 3347-01-01-1295
RFW Contact: R. Henry Phone: (201)932-9208 Due Date:

SAMPLE IDENTFICATION

ANALYSES REQUESTED

Sample No.	Sampling Location	Matrix	Date Collected	Container/Preservative	BNA				
4338	TL 1	W	8/3/89	(2) 1 L amb/4°C	✓				

Matrix:
S Soil DS- Drum Solids
W Water DL- Drum Liquids
O Oil X- Other

Special Instructions:

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	
Al/Sb/As	[signature]	[signature]	8/4	1317					
		[signature]	8/5	11:05					

APPENDIX B

CHAIN OF CUSTODY
FIELD DATA SHEETS
LOG TRANSCRIPTS

Roy F. Weston, Inc.
REAC, Edison, N.J.
EPA Contract 68-03-3482

CHAIN OF CUSTODY RECORD/LAB WORK REQUEST

No: 1072

SHEET NO 1 OF 1

Project Name: TORCH LAKE
Project Number: 33-17-01-01
RFW Contact: R. Henry Phone: 201-321-7118 Due Date:

SAMPLE IDENTFICATION

ANALYSES REQUESTED

Sample No.	Sampling Location	Matrix	Date Collected	Container/Preservative	BNA				
4338	TL 1	W	8/3/87	(2) 1 liter amb/4°C	✓				

Matrix:
S- Soil DS- Drum Solids
W- Water DL- Drum Liquids
O- Oil X- Other

Special Instructions:

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date
			8/4	1330				

FIELD DATA SHEET

№ 004338

Roy F. Weston, Inc.
REAC, Edison, N.J.
EPA Contract 68-03-3482

Lab No.: _____ Samplers: S Mayasich | R Hamy
Date: 8/3/89 Site Name: TORCH LAKE
Time: 1215 Sample Location: 3 1

Chain of Custody No. 1072
REAC Task Leader: S. Mayasich
EPA Task Monitor D. Charters
Project No.: 1295

SITE DESCRIPTION
landfill, industrial, commercial, residential, hedgerows; old field, wooded, farmland, gully, floodplain; upland palustrine, lowland riverrine, (lacustrine)

SOIL TYPE
rock, clay, gravel, muck, sand, loam, silt, peat, color _____

SURFACE WATER
color light amber tint, odor _____, flow _____, direction _____

STREAM
width _____, depth _____, velocity _____ cm/s, pools _____ %, riffles _____ %

BOTTOM
rock, slit, rubble, clay, gravel, organic, shell, other _____, sand

SAMPLE TYPE
stream/surface, groundwater, brackish, ocean/saline, sediment; soil, (pond/lake), river, effluent, sludge

DEVICE
(kemmerer), ponar, trowl, other _____, bucket, sugar, ekman

SAMPLE INFORMATION
color _____ pH _____
odor _____ ORP _____
temp _____ salinity _____
DO _____ sample depth _____
cond _____ tide stage _____

WEATHER PARAMETERS
ambient temp 78°F
barometric pressure _____
relative humidity _____
weather conditions windy, part: cloudy

ANALYSES TO BE PERFORMED

TOC required? _____Yes _____No
If No, explain _____

Grain size analysis required? _____Yes _____No
If No, explain _____

ORGANICS
- A. halogenated & aromatic volatiles
- B. volatiles-USEPA 624
- C. trihalomethanes
- D. pesticides/PCB
- E. PCB
- (F) base neutral/acid extractables-USEPA 625
- G. pesticides, drinking water
- H. herbicides, drinking water

INORGANICS
- A. metals, priority pollutant
- B. metals scan (ICP)
- C. metals, other _____

RCRA
- A. EP toxicity _____metals _____pesticides _____herbicides
- B. ignitability
- C. corrosivity _____pH_____
- D. reactivity

LIMITED CHEMISTRY
- A. total cyanide
- B. total phenol
- C. petroleum hydrocarbons
- D. pH
- E. alkalinity
- F. hardness
- G. total dissolved solids
- H. total suspended solids
- I. sulfate

OTHER ANALYSES (specify)
_____
_____

AIR SAMPLING
Sampling Method _____
Sample Flow Rate _____
Sampling Time _____
Volume Collected _____

SAMPLE PREPARATION

CONTAINER	PRESERVATIVES
(Amber glass jar)	HNO3
plastic jar	NaOH
acetate core	Zn Acetate
plastic bag	HCL
plastic bucket	Na2SO4
4L plastic	other 4°C

STORAGE
wet ice
dry ice
ambient

BIOASSESSMENT
See attached data sheet
See comments

Collection Media
Special Shipping Instructions _____
#Field Blanks ___ #Sample Blanks ___

COMMENTS:
Water collected from 19 ft, total depth 21.5 ft

Aug. 3, 1989

Left motel for site 0645, found site but others not yet arrived. Hours for week Sat 8 Sun. 10 ~~15~~ Mon. 14 Tues. 14½ Wed. 9½ 15.94 12.95

Called in hours of R.H., D.M. + mc to Mary Albani. Also spoke with Craig Moylan - verbal results for samples from Medicine Lake should be available this afternoon, asked if we had shipped equipment needed at Aberdeen, & said yes. We should call back for results later.

Dave Charters asked for tackle box with folding shelves + compartments for ROV spares. 0935 setting up for ROV & one ~~RNA~~ water sample with Kaemmer. OSC said 2 mil tons of tails have been dumped in Torch lake from copper operations. Sanger have recently stopped reproducing + no longer live in lake. Equestom ~~present~~ in lake [copper] Dave Charters request: "NEUTRAL BOUANCY CABLE for ROV. Hydrolab reading + (4 samples) are drums

1 ft.	Temp	23.71	2 ft.	23.71	3 ft.	23.70	4 ft.	23.67
	pH	7.49		7.52		7.54		7.60
	D.O	10.26		10.23		10.17		10.16
	cond	0.254		0.253		.1541		0.254
	Sal	0.152		0.157		.152		0.153
	Sal	0.0		0.0		0.0		0.0

5 ft.	23.66	6 ft.	23.64	7 ft.	23.64	8 ft.	23.62	9 ft. 23.56
	7.60		7.64		7.62		7.60	7.59
	10.17		10.10		10.14		10.06	9.95
	0.254		0.254		0.254		0.254	0.254
	0.154		0.154		0.155		0.156	0.157
	0.0		0.0		0.0		0.0	0.0

10 ft.	23.50	11 ft.	23.45	12 ft.	23.40	13 ft.	23.20	14 ft. 22.85
	7.57		7.57		7.55		7.53	7.49
	10.00		9.98		9.86		9.85	9.86
	0.254		0.253		0.254		0.254	0.254
	0.158		0.159		0.160		0.161	0.163
	0.0		0.0		0.0		0.0	1.0

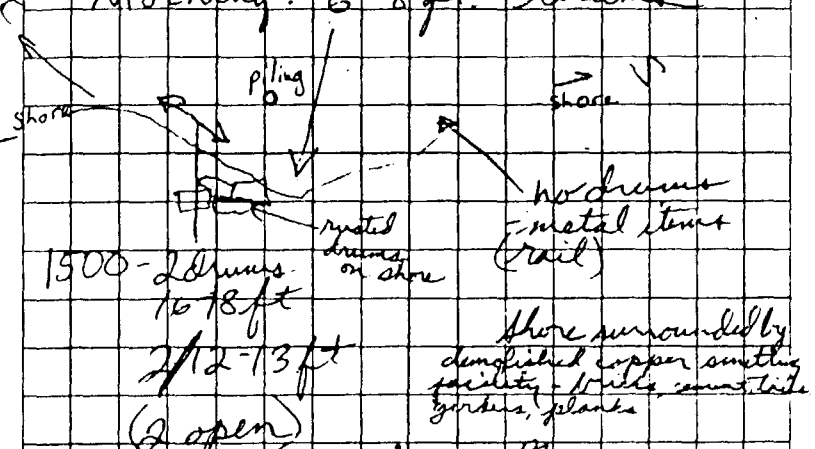
15 ft.	22.60
	7.45
	9.69
	0.254
	0.165
	0.0

16ft	22.36	17ft	22.29	18ft.	22.13
	7.37		7.36		7.37
	9.66		9.59		9.43
	0.254		0.254		0.254
	0.167		0.168		0.169
	0.0		0.0		0.0
19ft	21.68	20ft	21.49	21ft	21.25
	7.28		7.25		7.20
	9.22		9.22		9.21
	0.255		0.254		0.254
	0.171		0.172		0.173
	0.0		0.0		0.0
Bottom	21.5ft.	21.26			
		7.19			
		9.21			
		0254			
		0.173			
		0.0			

Filled two 1l amber bottles for BNA analysis using Kacmmerer bottle. Filmed operation with ROV. 1230-1330 Lunch → ~~Hoss~~ Also bought cooler & Tackle Box in Calumet. Packed samples in cooler in vermiculite. Put out ROV again after changing fuse. Weather overcast, muggy in morning, high 70's. Wind came up around 11:00 - stay & partly cloudy in afternoon. Continued ROV search

~~drums~~ sited - 2 (open) at 15 ft 3 closed at ~~15ft~~ 6 to 8' = metal along ~~S.W. facing shore~~ SW

Morning: 6-8 ft. 3 drums



1500 - 2 drums
16 18 ft
2 12-13 ft
(2 open)

1630 - 3 drums closed

Film for Med Lake + Torch lake site characterization in briefcase - process Mon

OSC - Creosote was used in copper processing to remove copper from ~~mines~~ rock because of its specific gravity (as a flotation media)

1700 pulled out ROV from NE shore. Also bag of logger video tapes, winter for camera bubble. Went further down beach with ROV - found bass + redhorse carp. Filled in CV 1830, bring it to

more video tapes, field fuse & seat
R2V back at 1800. Buy: Fuse puller, cable
ties, small vise grip + wire cutters. Plants noted:
Equisetum, birch, aspen, alder, Indian tobacco,
lichens (various), Polygonum sp., white flowered
fuzzy ground fern, rush, snapdragon, daisy,
ragweed, rocky-gravelly sparse grasses.
Need edited versions of Medicine Lake &
Torch Lake Video tape sets for OSC.
Set of open end crescent wrenches. Packing
ROV Grabber
1930. Finished packing truck at sight 2000
Drove truck to landing to pick up
Zodiac & R2V equip. Finished packing
2200 - arrived back at motel 2230. AM.

5/3/89 Torch Lake
Depart Hotel 0630

0700 Arrive Torch Lake
Lake Linden Rec Area

0810 Walter Neid Dave Charlton
arrive on-site
proceede to staging area

0815 set up operation

1150 Calibrate Hydrolab
barometric pressure 726 mm Hg
100% sat O2 = 7.57 mg/l

Temp	27.21	
O2	8.46	7.57
Cond	.784	.718
pH 7	6.07	7.00
pH 4	3.86	4.00
pH 7	6.97	

calibration complete 1200

Prepare to collect 1 BNA sample
4338 water

Deploy ROV @ 0945
Recover ROV @ 1130 time Δ
Hydrolab readings ~ location of pier
1130 - 1200

Depth	Temp	pH	DO	COND	ORP
1.0	23.71	7.49	10.26	0.254	0.152
2.0	23.71	7.57	10.23	0.253	0.152
3.0	23.70	7.57	10.17	0.254	0.152
4.0	23.67	7.60	10.16	0.254	0.153
5.0	23.66	7.60	10.17	0.254	0.154
6.0	23.64	7.61	10.10	0.254	0.154
7.0	23.64	7.62	10.14	0.254	0.155
8.0	23.62	7.60	10.06	0.254	0.156
9.0	23.53	7.59	9.95	0.255	0.157
10.0	23.50	7.57	10.00	0.254	0.158
11.0	23.45	7.57	9.98	0.253	0.159
12.0	23.40	7.55	9.86	0.254	0.160
13.0	23.20	7.53	9.85	0.253	0.161
14.0	22.85	7.49	9.86	0.254	0.163
15.0	22.60	7.45	9.69	0.254	0.165
16.0	22.36	7.37	9.66	0.254	0.167
17.0	22.29	7.36	9.59	0.254	0.168
18.0	22.13	7.33	9.43	0.254	0.169
19.0	21.68	7.28	9.22	0.255	0.171
20.0	21.49	7.25	9.22	0.254	0.172
21.0	21.28	7.20	9.21	0.254	0.173
21.5	21.26	7.19	9.21	0.254	0.173

③

salinity 0.0 @ surf to 21.5 @ 1'

1 sample collected for BNA analysis in water @ 1215
4338 TL1

Prepared additional non-essential equip for shipment

1400 FED EX 1-800-238-5355
earliest pickup at ~1200
8/7/89 for delivery Sat 8/8

For next day service package must be at Kingston by 1130 today
675 East Blvd
Kingsford MI 49801

at corner of Hooper and East Blvd Hrs 9-5:30 PM

1415 US Post Office - earliest next day service for delivery on Sat

④

1455 Call PEAC to arrange for Sat delivery of samples
Craig Maylon
Marian Murphy

TOC	1	19%
	2	17%
	4	13%

Volatiles in water DL = 1 ppb

Compound	Blank	4333	4334	4336	4337
Acetone	1.2		.5JB	1.3B	99B
2 Butanone	.4J	.9JB	1.6B	.9JB	1.6B
Naphthalene	.3J				

	4339
Acetone	1.9B
2 Butanone	1.1B

Soil BNA compounds (ug/kg)	Blank ⑤ Conc	DL	4333 Conc	DL	4334 Conc	DL	4337 Conc	DL	⑥
Di-n-butyl phthalate	548	330	3399	2200	12600	2063	6860	1065	
Fluoranthene			287J		369J				
Pyrene			137J		138J				
Butyl benzyl phthalate	26J		159J		357J		7,144		
Benz(a)anthracene					137J				
Bis(2-ethylhexyl) Phthalate	260J				1702		50,866		
Chrysene					147J				
Di-n-octyl Phthalate							114,94		
Benzo(a)pyrene					252J				
all other BNA compounds	ND								

Soil Volatile Compounds	Blank DL=1ug/l	4333	4334	4337
Styrene	.4J			
1,4-Dichlorobenzene	.3J			
1,2,4-Trichlorobenzene	.4J			
Naphthalene	1.3			
1,2,3 Trichlorobenzene	.7J			
Acetone	4.4	56B	37B	7.0B
2-Butanone	1.9	19B	17B	3.0B
Benzene		.4J		
Toluene		9.8	4.8	1.8
1,2,4-Trimethylbenzene		.4J		

purchase for ROV field kit
open end wrench set
wire strips
wire cutters

1930 recovered ROV
demobilized from site to
pack equip

2130 Depart site

2200 Arrive hotel

End of day

8/4/89

0800 Start of day
demobilize
prepare manifests
ship equip std air
ship samples 1st for Sat delivery

1710 Flt 3330 to Detroit
depart Houghton 1750
arrive Detroit 2030
rebook flt 0432
depart Detroit 2315
arrive NWK 0130
arrive home 0200

End of day

APPENDIX C

HEALTH AND SAFETY PLAN

WESTON/REAC WORK LOCATION HEALTH AND SAFETY PLAN

Prepared by: SALLY MAYASICH REAC Approval: Martin J O'Neill

Date: 7/27/89

1.0 INTRODUCTION

Site Name: Torch Lake, Michigan WA # 1295

Original Safety Plan: Yes ✓ No ___ Modification No. _____

Location: Street No.: Torch Lake

City: Houghton

State: Michigan

Site Contact: _____ Site Phone # _____

Directions to Site: From Mpls. I-35E North to US 8 to (17) at Rhinelander - North on US 45 to Houghton - (26) to Torch Lake — (26) also goes to Calumet (Public Hospital located in Calumet.)

1.1 Site/Incident Description

A. Urban ___ Residential ___ Commercial ___
Industrial ___ Rural X Remote ___
Active ___ Inactive ___ Landfill ___

B. Spill ___ Air Release ___ Fire ___
HW Site ___ Other: _____

C. Containers involved? X Yes ___ No
Drums: X No. # ? Tanks ___ No. # ___
Describe condition: unknown

D. Site size: 600 Acres - Terrain: Lake Weather _____

E. Are Regional TAT's Onsite? Yes ___ No ___

F. Map attached: Yes ✓ No ___

rd:eh/H&SPLANS/H&S-LOCATION

1.2 Summarize Site History: Drums have been stored.

1.3 Background Information Sources (Report Titles, Names, Dates):

Very little information was available from the work assignment manager.

1.4 Scope of Work:

A. Emergency Response ___ Air Sampling ___ Bioassessment ___
Contractor Oversight ___ Treatability Study ___
Geophysical Monitoring ___ Well Sampling ___
Well Installation ___ Soil Sampling ___ Tank Sampling ___
Drum Sampling ___ Bulk Sampling ___
Lagoon Sampling ___ Sediment Sampling ___
Surface Water Sampling ___ Walk Through Assessment ROV Drum Search

B. Task Description	Date of Activity
ROV - Drum search	5/3 - 5/4/89

2.0 KEY PERSONNEL

EPA Work Assignment Manager: DAVID CHARTERS

EPA On-Scene Coordinator: _____

REAC Task Leader: KEN MCINNEY

Subcontractor: (✓ None) _____

Field Supervisor: DAVID CHARTERS

REAC Site Safety Coordinator: SALLY MAYASICH

3.0 TASK/OPERATION SAFETY AND HEALTH RISK ANALYSIS

3.1 Chemical/Exposure Hazards

___ Inhalation	___ Ingestion	___ Skin contact
___ Biological	___ Explosive	___ Flammable
___ Radioactive	___ Pressure sensitive	___ Water reactive

3.2 Physical Hazards

Heat X Cold ___ Heavy machinery ___
Noise ___ Underground utilities ___
Overhead hazard ___ Unguarded floor opening/lagoons ___
Weights/lifting ___ Pressurized air ___
Compressed gases ___ Ladders ___ Scaffolds ___
Building entry ___ Test-pits ___
Confined space (attach confined space entry plan) ___

Other: Electrical//Generators

_____

_____

3.3 Table 3.3 provides a summary of chemical and physical hazards potentially encountered by personnel during each task.

TABLE 3.3
TASK RISK ANALYSIS: CHEMICAL HAZARDS OF CONCERN

Task	Contaminant	PEL/TLV/IDLH	Source/ Concentration Onsite	Route of Exposure	Monitoring Device
no sampling					

TASK RISK ANALYSIS: PHYSICAL HAZARDS OF CONCERN

Task	Hazard	Description	Prevention/Monitoring Technique
ROV-Drum Search	Heat		Monitor pulse - if over 110 - lengthen rest period - shorten work time by ⅓ - Drink fluids before & during work

4.0 PERSONNEL TRAINING REQUIREMENTS

Consistent with OSHA's 29 CFR 1910.120 regulation covering Hazardous Waste Operations and Emergency Response, all site personnel will be trained in accordance with the requirements. At a minimum, all personnel will be trained to recognize the hazards on-site, the provisions of this SHSP, and personnel responsible for safety at this site.

4.1 Site supervisors must be trained to meet the additional requirements for supervisors. The following individuals will serve as field supervisors for this project:

_____

4.2 Site Specific Training Topics

The following topics will be discussed by the REAC field team leader prior to commencement of onsite activities:

___ Site Hazards ___ Emergency Procedures ___ (Table 3.3)

Other: _____

_____

5.0 PERSONNEL PROTECTIVE EQUIPMENT

5.1 Protective Ensemble

Tasks: _____	Tasks: _____	Tasks: ROV Drumsearch
Level B ___	Level C ___	Level D ✓
___ Saranex	___ Saranex	___ Tyvek
___ Tyvek	___ Tyvek	✓ Cotton Coveralls
___ Other: _____	___ Other: _____	___ Other: _____
___ SCBA	___ APR	___ Eye Protection
___ Tetherline	___ Cartridge: ___	___ Booties
___ Booties	___ Booties	___ Hard Hat
___ Surgicals	___ Surgicals	✓ Surgicals
___ Gloves: _____	___ Gloves: _____	✓ Work Gloves
___ Overgloves: _____	___ Overgloves: ___	___ Escape Pack
___ Hard Hat	___ Hard Hat	✓ Steel Toe/
___ Steel Toe/Shank Boots	___ Steel Toe/Shank Boots	Shank Boots

Additional Protective Clothing:

✓ Rain Gear	___ Hard Hat Liner	___ Splash Apron
___ Fireman Boots	___ Insulated Coveralls	___ Splash Shield

5.2 Justify levels of protection selected:

We will be working from shore & will not come in contact with anything but water.

6.0 SITE AIR MONITORING PLAN N/A

6.1 Instrument Calibration

Required Instrument	Calibration Date	Battery Check
___ HNU	_____	_____
___ OVA	_____	_____
___ CGI	_____	_____
___ Monotox: Type: _____	_____	_____
_____	_____	_____
_____	_____	_____
___ Oxygen Detector	_____	_____
___ RAM-I	_____	_____
___ Mini-RAM	_____	_____
___ Draeger Tube		
Type: _____	_____	_____
_____		

6.2 Person(s) Responsible for Monitoring (___ indicates competence test checkout):

_____ _____

_____ _____

6.0 SITE AIR MONITORING PLAN N/A

6.1 Instrument Calibration

Required Instrument	Calibration Date	Battery Check
___ HNU	_____	_____
___ OVA	_____	_____
___ CGI	_____	_____
___ Monotox: Type: _____	_____	_____
_____	_____	_____
_____	_____	_____
___ Oxygen Detector	_____	_____
___ RAM-I	_____	_____
___ Mini-RAM	_____	_____
___ Draeger Tube Type: _____	_____	_____
_____		

6.2 Person(s) Responsible for Monitoring (___ indicates competence test checkout):

_____ _____

_____ _____

_____ _____

6.3 Type of Monitoring:

___ Survey/Characterization ___ Perimeter

___ Work Zone ___ Exposure/Breathing Zone

6.4 Objective of Monitoring: _____

_____

6.5 Action Levels: _____

_____

_____

_____

_____

_____

7.0 MEDICAL MONITORING

All personnel are expected to maintain a current status with respect to their employers medical monitoring program. Weston maintains an annual schedule of update medicals. Subcontractors will be expected to provide documentation of current medical.

8.0 SITE CONTROL

8.1 Buddy system is required for all site work involving levels of protection or potentially representing a risk to personnel.

8.2 Site communications plan:

X	Radio's	___	Air Horn
___	Whistle	___	Megaphone
___	Hand Signals:		

Signal	Definition
Hands clutching throat	Out of air/can't breath
Hands on top of head	Need assistance
Thumbs up	OK/I'm alright/I understand
Thumbs down	No/negative
Arms waving upright	Send backup support
Grip partners wrist	Exit area immediately

8.3 Site Work Zones:

The Exclusion Zone is defined as the area where contamination is either known or likely to be present, or because of activity, will provide a potential to cause harm to personnel. Entry into the Exclusion Zone requires the use of personnel protective equipment.

The Contamination Reduction Zone is the area where personnel conduct personal and equipment decontamination. It is essentially a buffer zone between contaminated areas and clean areas. Activities to be conducted in this zone will require personal protection as defined in the decontamination plan.

The Support Zone is situated in clean areas where the chance to encounter hazardous materials or conditions is minimal. Personal protective equipment is therefore not required.

Site work zone definition can be found:

X	Site map	___	Sketch on reverse of this page

8.4 Nearest Medical Assistance

The following personnel on-site have current certification on CPR and/or First Aid.

NAME	CPR	FIRST AID
SALLY MAYASICH	✓	✓
KEN MCNNEY	✓	✓

Directions and a map to the nearest medical assistance is attached to this plan.

8.5 Standing Orders

Standing Orders for Exclusion Zone
[Delete or add steps as necessary]

- o No smoking, eating, or drinking in this zone.
- o No horse play.
- o No matches or lighters in this zone.
- o Check-in on entrance to this zone.
- o Check-out on exit from this zone.
- o Implement the communications system.
- o Line of sight must be in position.
- o Wear the appropriate level of protection as defined in the SHSP.

Standing Orders for Contamination Reduction Zone
[Delete or add steps as necessary]

- o No smoking, eating, or drinking in this zone.
- o No horse play.
- o No matches or lighters in this zone.
- o Wear the appropriate level of protection.

9.0 DECONTAMINATION PLAN

Describe decontamination sequence for each level of protection to be used on-site. — N/A

Step 1

Step 2

Step 3

Step 4

Step 5

Step 6

Step 7

Step 8

Step 9

Step 10

Are personnel required to assist with decon? ___ Yes ___✓ No

If yes, what level of protection is required for those assisting? (Circle one) B, C, D.

Describe disposition of wastes: _____

10.0 CONTINGENCY PLANNING

10.1 Identify location of the following during the site orientation.

___✓ First Aid Kit: vehicle/command post Eye Wash: _____
___ Stretcher: _____ Emergency Shower: _____
___✓ Fire Extinguisher: vehicle

___ Public Telephone: _____
___ Site Telephone: _____
___ Mobile Telephone: _____
___✓ Two-Way Radios: With each crew + at command post
___ Telephone Contact Lists: at command post

___ SCBA's: _____
___ Escape Packs: _____

___ Evacuation Routes: _____

_____

_____

10.2 Emergency Contact/Notification System

The following list provides names and telephone numbers for emergency contact personnel.

Organization	Contact	Area code 906 Telephone
Ambulance:		482-2211
Police:		482-2121
Fire:		482-1234
State Police:		337-2211
Hospital #1:	Hancock (Portage View)	482-1122
Hospital #2:	Calumet Public	337-3100
Poison Control Center		1-800-562-9781
Regional EPA:		
State Authority:		
National Response Center		800-424-8802
Center for Disease Control		404-488-4100
CHEMTREC		(800) 424-9300
TSCA HOTLINE		(202) 554-1404
RCRA HOTLINE		(800) 424-9346
CDC	(DAY)	(404) 452-4100
	(NIGHT)	(404) 329-2888
BUREAU OF ALCOHOL, TOBACCO & FIREARMS		(800) 424-9555, (202) 566-7777
NATIONAL RESPONSE CENTER		(800) 424-8802
WESTON MEDICAL EMERGENCY SERVICE		(513) 421-3063
PESTICIDE INFORMATION SERVICE		(800) 424-9346
BUREAU OF EXPLOSIVES, A.A. RAILWAYS		(202) 835-9500
WESTON REAC OFFICE		(201) 632-9200
Scott Butterfield, Weston Program Manager		(201) 632-9770 (W) (609) 394-3682 (H)
Craig Moylan, Operations Manager		(201) 632-9774 (W) (215) 383-0477 (H)
Martin O'Neill, Health & Safety Manager		(201) 632-9773 (W) (201) 219-9207 (H)
	(BEEPER)	(201) 519-9115

10.3 Medical Emergencies

Any person who becomes ill or injured in the exclusion zone must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. If the patient's condition is serious, at least partial decontamination should be completed (i.e., complete disrobing of the victim and redressing in clean coveralls or wrapping in a blanket.) First aid should be administered while awaiting an ambulance or paramedics.

Any person being transported to a clinic or hospital for treatment should taken with them information on the chemical(s) they have been exposed to at the site. This information is included in Section 3.0 of this plan. Map with directions to the hospital can be found: _____ next page _____ sketch on reverse side of this page.

10.4 Fire or Explosion

In the event of a fire or explosion, the local fire department should be summoned immediately. Upon their arrival, the designated personnel will advise the fire commander of the location, nature, and identification of the hazardous materials onsite.

If it is safe to do so, site personnel may:

- Use fire fighting equipment available onsite to control or extinguish the fire; and,
- Remove or isolate flammable or other hazardous materials which may contribute to the fire.

10.5 Spill or Leaks

In the event of a spill or a leak, site personnel will:

- Inform their supervisor immediately;
- Locate the source of the spillage and stop the flow if it can be done safely; and,
- Begin containment and recovery of the spilled materials with sorbent (vermiculate, etc.).

11.0 ACKNOWLEDGMENT

I have read, understood, and agreed with the information set forth in this Health and Safety Plan and will adhere to the protocols specified herein.

RICHARD HENRY	Richard Henry	7/30/89
Site Manager	Signature	Date
SALLY MAYASICH	Sally Mayasich	7/30/89
Site Safety Coordinator	Signature	Date
David B. McKinnis	David B. McKinnis	7/30/89
Field Team Member	Signature	Date
Field Team Member	Signature	Date
Field Team Member	Signature	Date
Field Team Member	Signature	Date
Field Team Member	Signature	Date
Field Team Member	Signature	Date
Field Team Member	Signature	Date

SUBCONTRACTORS:

Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date

rd:eh/H&SPLANS/H&S-LOCATION

SITE SAFETY COORDINATORS REPORT: Please return this page with a copy of the plan and acknowledgement form to REAC Health and Safety Manager.

1.0 Site Name: Torch Lake

W.A.#: 1295 Prepared by: S. Maynard Date 8/29/89

2.0 Tasks Performed	Dates of Activity
Drum search + water sample	8/3/89

3.0 Future Activity? Yes ___ No X If yes, explain: _____

4.0 Describe if there were any changes made to the protection program?

No

5.0 Summarize Findings (be sure to discuss monitoring results).

No BNA's detected

6.0 Was the Health and Safety plan adequate? Yes X No ___

What changes can be made for future activities?

Sally Maynard
Signature

REAC Health and Safety

rd:eh/H&SPLANS/H&S-LOCATION

APPENDIX D

TRIP REPORT

rd:eh/MAYASICH/FR-2295

REAC SUPPORT ORGANIZATION
GSA RARITAN DEPOT
WOODBRIDGE AVENUE
BUILDING 209, BAY F
EDISON, NJ 08837
PHONE: 201-632-9200

DATE: August 18, 1989

TO: David Charters, EPA/ERT Work Assignment Manager

FROM: Sally Mayasich, REAC Task Leader

THRU: Craig Moylan, REAC O&A Section Chief

SUBJECT: TORCH LAKE DRUM TRIP REPORT
WORK ASSIGNMENT NUMBER 3347-01-01-1295

BACKGROUND

Torch Lake is a freshwater lake located approximately 5 miles north of Houghton, Michigan. Drums possibly containing wastes such as creosote from copper smelting operations have been reported. Creosote was used as a flotation medium because of its high specific gravity to separate copper from the tailings. As much as two million tons of copper ore tailings have been dumped into the lake.

The U.S. EPA Region V office contacted the EPA Environmental Response Team (ERT) to search for the drums and to determine whether any leakage of hazardous substances into the lake had occurred. The Response, Engineering, and Analytical Contract (REAC) received a work assignment to assist EPA/ERT in this effort.

OBSERVATIONS AND ACTIVITIES

Participating in the drum search August 3, 1989 were Walter Neid, EPA Region V On-Site Coordinator (OSC), David Charters, EPA/ERT Work Assignment Manager, and Sally Mayasich, Richard Henry, and David Mickunas, REAC. A staging area was established at the edge of the lake on the foundation of a demolished copper processing facility just off highway 26 between Hubbell and Lake Linden. The Remotely Operated Vehicle (ROV), television monitor, video cassette recorder, and ROV control unit were powered by a gas generator. The OSC had information on the general location of the drums, and therefore no other locating systems were required. All underwater search activities were observed on the video monitor and recorded on video cassette tapes. Ten drums were located and filmed. Three were near shore in 6-8 feet of water and seven drums were along the southeast-facing shore in 12 to 20 feet of water. Along the northeast-facing shore no drums were found but other metal items such as rails and girders were seen.

eh/MAYASICH/TR-1295

The ROV cable was tended by one person from shore and another from the Zodiac inflatable boat. Floats had been placed on the ROV cable every 8 to 10 feet up to 50 feet from the ROV. Several fuses in the thruster circuits were blown, requiring that the ROV be periodically removed from the water and partially disassembled for fuse replacement.

General biological and physical characteristics of Torch Lake were recorded. The plant community on the lakeshore included species typical of the regional vegetation, such as birch, aspen, alder, ash, and lichens. Opportunistic weed species seen were typical of a secondary successional plant community created by the demolition of the copper facility and included ragweed, daisy, snapdragon, smartweed, flowering spurge, equisetum, common mullein, and common yarrow. Grasses were sparse. Soil composition consisted of coarse gravel and rock near the staging area. No aquatic plants were observed. The lake bottom was rocky near shore and appeared to be muck further from shore, although no sediment samples were taken. Fish spotted by the ROV included a bass and a redhorse sucker. According to the OSC, sauger no longer reproduce in the lake.

Sampling and in-situ water quality readings using the Hydrolab Surveyor II were accomplished from the Zodiac boat at a site approximately 30 feet from shore over the drums. The total depth was 21.5 feet. One water sample was secured using a brass Kemmerer bottle which had been decontaminated using a soap water wash, deionized water rinse, nitric, acid rinse, deionized water rinse, acetone rinse, and air dry. The sample was taken near the bottom and deposited in two 1l amber glass bottles which were preserved for base/neutral/acid extractable analysis at $4^{o}C$ until receipt by the ERT/REAC lab on Saturday, August 4. The Hydrolab Surveyor II was calibrated and operated according to Hydrolab Corporation Surveyor II Operating Manual (Revision A, February, 1985). Parameters measured included temperature, dissolved oxygen, pH, conductivity, oxidation/reduction potential, and salinity.

CONCLUSIONS AND RECOMMENDATIONS

The problem of blown fuses was probably caused by small objects caught in the thrusters and will need to be solved by the manufacturer, but the fact that the ROV cable is heavy and cumbersome may have contributed. A neutral buoyancy cable of a high visibility will be purchased. The deployment of the cable also requires additional personnel to keep the ROV free of entanglement and allow complete mobility. Two people are needed to tend the cable for both shore and boat deployment. If sampling or other tasks are also being done, it is recommended that more REAC personnel be onsite in future ROV operations.

A biological assessment is also recommended at this site, including fish and primary productivity studies to determine the impact the copper industry has had on the lake.